

Japanese Utility Model Appl. Laid-Open (kokai) No. HEI  
5-47062

5 Laid-Open (kokai) Date: June 22, 1993

Int. Cl.<sup>5</sup> E02F 9/24 G01S 15/88 15/93

Title of the Utility Model: Emergency shutdown system  
in vehicles system construction equipment

Application No.: HEI 3-98659

10 Filing Date: November 29, 1991

Inventor: Munehiko KOMOIKE, Nobuyuki KOBAYASHI

Applicant: SHIN CATERPILLAR MITSUBISHI LTD.

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**CLAIMS**

[A utility model registration claim]

[Claim 1] Set to an emergency shutdown system in a vehicles system construction equipment equipped with an activity machine by which power-driven is carried and carried out to vehicles, an obstruction detection means to detect that an obstruction exists in risk within the limits of said activity machine, and an emergency shut down means to stop actuation of said activity machine in response to a signal showing said obstruction detection means having detected an obstruction. An emergency shutdown system in a vehicles system construction equipment characterized by establishing a detector cutoff means to intercept an actuation circuit of said obstruction detection means when an actuation circuit of an alarm horn established in vehicles is interlocked with and said alarm horn operates.

[Claim 2] It is an emergency shutdown system in a vehicles system construction equipment characterized by coming to enable actuation of said detector cutoff means according to a posture of said activity machine in an emergency shutdown system in a vehicles system construction equipment indicated to claim 1.

[Claim 3] Said detector cutoff means is an emergency shutdown system in a vehicles system construction equipment characterized by coming to make actuation possible when it becomes the posture in which said obstruction detection means by which said activity machine was formed in this activity machine in an emergency shutdown system in a vehicles system construction equipment indicated to claims 1 or 2 is placed into an attainment field of said alarm horn.

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**DETAILED DESCRIPTION**

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[Detailed explanation of a design]

[0001]

[Industrial Application] This design is related with the safety device in a vehicles system construction equipment like a hydraulic excavator. Especially this design is related with the emergency shutdown system for detecting this obstruction and carrying out the emergency shut down of the activity machine during the activity of a construction equipment, when an obstruction exists in a hazard area.

[0002]

[Description of the Prior Art] For example, in vehicles system construction equipments, such as a hydraulic excavator, it has the emergency shutdown system for stopping activity machines, such as a shovel, immediately at the same time it detects whether the obstruction of a worker and others exists shovel digging-within the limits or in an angle of traverse and emits an alarm. Moreover, vehicles carried in such vehicles, such as not only an activity machine but a tractor and a dozer, are equipped with the back sensor for detecting a back obstruction during go-astern. The emergency shutdown system of the activity machine in semantics including such a tractor, a dozer, etc. is very important on the safety management of an activity.

[0003]

An example of the configuration of this conventional seed emergency shutdown system is shown in drawing 1. In drawing, the safety alarm 1 is formed among the operators a vehicles side and out of vehicles. This safety alarm 1 consists of an ultrasonic alarm 2 by the side of vehicles, and an ultrasonic alarm 3 by the side of an operator. The vehicles side alarm 2 consists of microphone 2d which receives the ultrasonic wave of another frequency sent from loudspeaker 2e which emits an ultrasonic wave to the perimeter, and the alarm 3 by the side of an operator. Microphone 2d and loudspeaker 2e are connected to signal processor 2b. The alarm 3 by the side of an operator consists of microphone 3d which receives the ultrasonic wave emitted from loudspeaker 2e of the alarm 2 by the side of vehicles, and loudspeaker 3e which sends an ultrasonic wave on another frequency only when the ultrasonic wave from the vehicles side alarm 2 is received.

[0004]

Microphone 3d and loudspeaker 3e are connected to signal processor 3b. Signal processor 3b of a carrier eclipse and the operator side alarm 3 makes microphone 3d of the operator side alarm 3, as for the ultrasonic wave which loudspeaker 2d of the vehicles side alarm 2 generates, generate the ultrasonic wave of another frequency to loudspeaker 3d. Similarly, the ultrasonic wave which loudspeaker 3e of the operator side alarm 3 generates can be received in microphone 2d of the vehicles side alarm 2. Only when the ultrasonic wave of another frequency which the vehicles side alarm 2 sends the ultrasonic wave of a certain frequency by loudspeaker 2e, and is sent from the operator side alarm 3 after fixed time amount is detected, it recognizes as that in which an operator exists. Moreover, after sending an ultrasonic wave from the vehicles side alarm 2, the distance to an operator is judged by time amount until it receives the ultrasonic wave from the operator side alarm 3.

[0005]

Signal-processing display 2b of the vehicles side alarm 2 outputs an obstruction signal to 2f of signal lines in response to the detecting signal, when microphone 2d detects an obstruction.

[0006]

The hydraulic pump 9 driven with this engine 10 is formed in the engine 10 carried in vehicles. Furthermore,

solenoid valve 4, and drives this solenoid valve 4 in the close direction. When a solenoid valve 4 closes, the pilot oil pressure to a control valve 6 is intercepted, and a control valve 6 is held in a center valve position. Therefore, supply of the oil pressure to a cylinder 7 is cut off.

[0007]

In addition to the solenoid valve 4, with the equipment shown in drawing 1 , the 2nd solenoid valve 5 is formed in the hydraulic circuit from the pilot pump 8 to a control valve 6. This solenoid valve 5 is driven in the closing direction like a solenoid valve 4 with the obstruction signal outputted to 2f of signal lines. In addition to the safety device by the solenoid valve 4, this 2nd solenoid valve 5 functions as a safety device of a duplex.

[0008]

Drawing 2 shows the example of the power shovel equipped with the safety alarm 1 shown in drawing 1 . the revolution in which this power shovel 12 was attached possible [ body 12a equipped with the crawler mold traveller, and revolution into this body ] -- a column -- 12b -- having -- revolution -- shovel 12c is prepared in column 12b. the body side alarm 2 of the safety alarm 1 -- revolution -- a column -- although attached also in 12b, as shown in drawing 2 , some are attached in a place also at shovel 12c. When making run vehicles or conveying these vehicles, shovel 12c is put on transit or a transportation figure as shown in drawing 2 .

[0009]

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**PRIOR ART**

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[Description of the Prior Art] For example, in vehicles system construction equipments, such as a hydraulic excavator, it has the emergency shutdown system for stopping activity machines, such as a shovel, immediately at the same time it detects whether the obstruction of a worker and others exists shovel digging-within the limits or in an angle of traverse and emits an alarm. Moreover, vehicles carried in such vehicles, such as not only an activity machine but a tractor and a dozer, are equipped with the back sensor for detecting a back obstruction during go-astern. The emergency shutdown system of the activity machine in semantics including such a tractor, a dozer, etc. is very important on the safety management of an activity.

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An example of the configuration of this conventional seed emergency shutdown system is shown in drawing 1. In drawing, the safety alarm 1 is formed among the operators a vehicles side and out of vehicles. This safety alarm 1 consists of an ultrasonic alarm 2 by the side of vehicles, and an ultrasonic alarm 3 by the side of an operator. The vehicles side alarm 2 consists of microphone 2d which receives the ultrasonic wave of another frequency sent from loudspeaker 2e which emits an ultrasonic wave to the perimeter, and the alarm 3 by the side of an operator. Microphone 2d and loudspeaker 2e are connected to signal processor 2b. The alarm 3 by the side of an operator consists of microphone 3d which receives the ultrasonic wave emitted from loudspeaker 2e of the alarm 2 by the side of vehicles, and loudspeaker 3e which sends an ultrasonic wave on another frequency only when the ultrasonic wave from the vehicles side alarm 2 is received.

[0004]

Microphone 3d and loudspeaker 3e are connected to signal processor 3b. Signal processor 3b of a carrier eclipse and the operator side alarm 3 makes microphone 3d of the operator side alarm 3, as for the ultrasonic wave which loudspeaker 2d of the vehicles side alarm 2 generates, generate the ultrasonic wave of another frequency to loudspeaker 3d. Similarly, the ultrasonic wave which loudspeaker 3e of the operator side alarm 3 generates can be received in microphone 2d of the vehicles side alarm 2. Only when the ultrasonic wave of another frequency which the vehicles side alarm 2 sends the ultrasonic wave of a certain frequency by loudspeaker 2e, and is sent from the operator side alarm 3 after fixed time amount is detected, it recognizes as that in which an operator exists. Moreover, after sending an ultrasonic wave from the vehicles side alarm 2, the distance to an operator is judged by time amount until it receives the ultrasonic wave from the operator side alarm 3.

[0005]

Signal-processing display 2b of the vehicles side alarm 2 outputs an obstruction signal to 2f of signal lines in response to the detecting signal, when microphone 2d detects an obstruction.

[0006]

The hydraulic pump 9 driven with this engine 10 is formed in the engine 10 carried in vehicles. Furthermore, the pilot pump 8 for pilot hydraulic pressure supply is formed in a hydraulic pump 9. The discharge pressure of a hydraulic pump 9 is sent to the oil hydraulic cylinder 7 for an activity machine drive through the activity mechanism valve 6. The pilot oil pressure from the pilot pump 8 is connected to the pilot port of the activity mechanism valve 6 through the hand control valve 11 operated by a solenoid valve 4 and control-lever 11a. When the solenoid valve 4 is open, the pilot oil pressure from the pilot pump 8 drives a control valve 6 to the actuated position of the upper part or a lower part according to the actuation direction of a hand control valve 11. The obstruction signal from the body side alarm 2 outputted to 2f of signal lines operates a

the pilot pump 8 for pilot hydraulic pressure supply is formed in a hydraulic pump 9. The discharge pressure of a hydraulic pump 9 is sent to the oil hydraulic cylinder 7 for an activity machine drive through the activity mechanism valve 6. The pilot oil pressure from the pilot pump 8 is connected to the pilot port of the activity mechanism valve 6 through the hand control valve 11 operated by a solenoid valve 4 and control-lever 11a. When the solenoid valve 4 is open, the pilot oil pressure from the pilot pump 8 drives a control valve 6 to the actuated position of the upper part or a lower part according to the actuation direction of a hand control valve 11. The obstruction signal from the body side alarm 2 outputted to 2f of signal lines operates a solenoid valve 4, and drives this solenoid valve 4 in the close direction. When a solenoid valve 4 closes, the pilot oil pressure to a control valve 6 is intercepted, and a control valve 6 is held in a center valve position. Therefore, supply of the oil pressure to a cylinder 7 is cut off.

[0007]

In addition to the solenoid valve 4, with the equipment shown in drawing 1, the 2nd solenoid valve 5 is formed in the hydraulic circuit from the pilot pump 8 to a control valve 6. This solenoid valve 5 is driven in the closing direction like a solenoid valve 4 with the obstruction signal outputted to 2f of signal lines. In addition to the safety device by the solenoid valve 4, this 2nd solenoid valve 5 functions as a safety device of a duplex.

[0008]

Drawing 2 shows the example of the power shovel equipped with the safety alarm 1 shown in drawing 1. the revolution in which this power shovel 12 was attached possible [ body 12a equipped with the crawler mold traveller, and revolution into this body ] -- a column -- 12b -- having -- revolution -- shovel 12c is prepared in column 12b. the body side alarm 2 of the safety alarm 1 -- revolution -- a column -- although attached also in 12b, as shown in drawing 2, some are attached in a place also at shovel 12c. When making run vehicles or conveying these vehicles, shovel 12c is put on transit or a transportation figure as shown in drawing 2.

[0009]

[Problem(s) to be Solved by the Device] In the emergency shutdown system accompanying the conventional obstruction detection shown in drawing 1, when vehicles are in a travelling figure or a transportation figure, the body side alarm 2 attached activity machine \*\* picking is put on the attainment range of the alarm tone voice of the alarm horn of vehicles. Since an alarm horn had the high sound power level in decibel, when the alarm horn was operated with the posture of this activity machine, there was a problem that the body side alarm attached in the activity machine incorrect-operated, and an emergency shutdown system operated.

[0010]

This design sets it as the first purpose to offer the emergency shutdown system which can prevent incorrect actuation of a body side alarm for the purpose of solving the above-mentioned problem in the conventional vehicles system emergency shutdown system.

[0011]

[Means for Solving the Problem] An obstruction detection means to detect that this design is carried in vehicles and an obstruction exists in risk within the limits of an activity machine by which power-driven is carried out, and this activity machine, Although this obstruction detection means is related with an emergency shutdown system in a vehicles system construction equipment equipped with an emergency shut down means to stop actuation of an activity machine in response to a signal showing having detected an obstruction In order to solve the above-mentioned technical problem, when an actuation circuit of an alarm horn established in vehicles is interlocked with and this alarm horn operates, about this design, a detector cutoff means to intercept an actuation circuit of an obstruction detection means is established.

[0012]

In a desirable mode of this design, a detector cutoff means is constituted so that actuation may be made possible according to a posture of an activity machine. When it becomes the posture in which an obstruction detection means by which an activity machine was formed in this activity machine is placed into an attainment field of an alarm horn, as for especially a detector cutoff means, it is desirable that actuation is made to be made possible.

[0013]

[Function and Effect] Since according to the above-mentioned configuration of this design the actuation circuit of an obstruction detection means is intercepted when the alarm horn of vehicles operates, also when operating an alarm horn during vehicles \*\*\*\*\* or transportation, a possibility that an obstruction

detection means may incorrect-operate disappears.

[0014]

[Example] Hereafter, one example of this design is explained about drawing 3 . In drawing 3 , the configuration of drawing 1 and a corresponding portion attach the same sign, and omit explanation. In the illustration example of this design, it has the detector interrupting device 14 prepared in the circuit which connects microphone 2d of the body side alarm 2 to signal processor 2b. This interrupting device 14 is constituted as a relay circuit which consists of normally closed relay contact 14a, normally open relay contact 14b, and relay coil 14c. Relay coil 14c is connected to the circuit of the actuation switch 16 of the vehicles alarm horn 15. If the actuation switch 16 of the alarm horn 15 is closed, in order that normally open relay contact 14b may close, the alarm horn 15 will generate an alarm tone. Since normally closed relay contact 14a opens to coincidence, a microphone 2d signal is not transmitted to signal processor 2b. Therefore, there is no possibility that the body side alarm 2 may incorrect-operate with the alarm tone which the alarm horn 15 generates.

[0015]

In drawing 3 , the detector interrupting device 14 can be replaced by micro KOMPYU pewter. Actuation of the equipment 14 in this case is attained by the program of micro KOMPYU pewter. An example of the actuation is shown in the flow chart of drawing 4 . \*\* is detected [ whether vehicles are in a travelling figure or a transportation figure first, and ] in drawing 4 . This detection should just be based on detection means, such as a pilot switch (not shown) prepared in activity machine 12c. When there are no vehicles in a travelling figure or a transportation figure, microphone 2d is maintained in the condition of having connected with signal processor 2b. When vehicles are in a travelling figure or a transportation figure, it detects whether the switch 16 of the alarm horn 15 of vehicles is in an operating state further. When there is no switch 16 in an operating state, it is a signal about microphone 2d.

It maintains in the condition of having connected with processor 2b. If a switch 16 is an operating state, microphone 2d will be intercepted from signal processor 2b.

[0016]

Since actuation of the body side alarm 2 is intercepted in this example of this design when the alarm horn 15 of vehicles is an operating state, or when vehicles are in a travelling figure or a transportation figure and the alarm horn 15 of vehicles is operated as stated above, there is no possibility that the body side alarm 2 may incorrect-operate with the alarm tone of the alarm horn 15.

[0017]

[Filing Date] January 22, Heisei 4 [the procedure amendment 1]

[Document to be Amended] Specification [the subject name for amendment] Whole sentence [the amendment method] Modification [the contents of amendment]

[Detailed explanation of a design]

[0001]

[Industrial Application] This design is related with the safety device in a vehicles system construction equipment like a hydraulic excavator. Especially this design is related with the emergency shutdown system for detecting this obstruction and carrying out the emergency shut down of the activity machine during the activity of a construction equipment, when an obstruction exists in a hazard area.

[0002]

[Description of the Prior Art] For example, in vehicles system construction equipments, such as a hydraulic excavator, it has the emergency shutdown system for stopping activity machines, such as a shovel, immediately at the same time it detects whether the obstruction of a worker and others exists shovel digging-within the limits or in an angle of traverse and emits an alarm. Moreover, vehicles carried in such vehicles, such as not only an activity machine but a tractor and a dozer, are equipped with the back sensor for detecting a back obstruction during go-astern. The emergency shutdown system of the activity machine in semantics including such a tractor, a dozer, etc. is very important on the safety management of an activity.

[0003]

An example of the configuration of this conventional seed emergency shutdown system is shown in drawing 1 . In drawing, the safety alarm 1 is formed among the operators a vehicles side and out of vehicles. This safety alarm 1 consists of an ultrasonic alarm 2 by the side of vehicles, and an ultrasonic alarm 3 by the side of an operator. The vehicles side alarm 2 consists of 2d of supersonic sensors which receive the

ultrasonic wave of another frequency sent from loudspeaker 2e which emits an ultrasonic wave to the perimeter, and the alarm 3 by the side of an operator. 2d of supersonic sensors and loudspeaker 2e are connected to signal processor 2b. The alarm 3 by the side of an operator consists of 3d of supersonic sensors which receive the ultrasonic wave emitted from loudspeaker 2e of the alarm 2 by the side of vehicles, and loudspeaker 3e which sends an ultrasonic wave on another frequency only when the ultrasonic wave from the vehicles side alarm 2 is received.

[0004]

3d of supersonic sensors and loudspeaker 3e are connected to signal processor 3b. Signal processor 3b of a carrier eclipse and the operator side alarm 3 makes 3d of supersonic sensors of the operator side alarm 3, as for the ultrasonic wave which loudspeaker 2d of the vehicles side alarm 2 generates, generate the ultrasonic wave of another frequency to loudspeaker 3d. Similarly, the ultrasonic wave which loudspeaker 3e of the operator side alarm 3 generates can be received in 2d of supersonic sensors of the vehicles side alarm 2. Only when the ultrasonic wave of another frequency which the vehicles side alarm 2 sends the ultrasonic wave of a certain frequency by loudspeaker 2e, and is sent from the operator side alarm 3 after fixed time amount is detected, it recognizes as that in which an operator exists. Moreover, after sending an ultrasonic wave from the vehicles side alarm 2, the distance to an operator is judged by time amount until it receives the ultrasonic wave from the operator side alarm 3.

[0005]

Signal-processing display 2b of the vehicles side alarm 2 outputs an obstruction signal to 2f of signal lines in response to the detecting signal, when 2d of supersonic sensors detects an obstruction.

[0006]

The hydraulic pump 9 driven with this engine 10 is formed in the engine 10 carried in vehicles. Furthermore, the pilot pump 8 for pilot hydraulic pressure supply is formed in a hydraulic pump 9. The discharge pressure of a hydraulic pump 9 is sent to the oil hydraulic cylinder 7 for an activity machine drive through the activity mechanism valve 6. The pilot oil pressure from the pilot pump 8 is connected to the pilot port of the activity mechanism valve 6 through the hand control valve 11 operated by a solenoid valve 4 and control-lever 11a. When the solenoid valve 4 is open, the pilot oil pressure from the pilot pump 8 drives a control valve 6 to the actuated position of the upper part or a lower part according to the actuation direction of a hand control valve 11. The obstruction signal from the body side alarm 2 outputted to 2f of signal lines operates a solenoid valve 4, and drives this solenoid valve 4 in the close direction. When a solenoid valve 4 closes, the pilot oil pressure to a control valve 6 is intercepted, and a control valve 6 is held in a center valve position. Therefore, supply of the oil pressure to a cylinder 7 is cut off.

[0007]

In addition to the solenoid valve 4, with the equipment shown in drawing 1, the 2nd solenoid valve 5 is formed in the hydraulic circuit from the pilot pump 8 to a control valve 6. This solenoid valve 5 is driven in the closing direction like a solenoid valve 4 with the obstruction signal outputted to 2f of signal lines. In addition to the safety device by the solenoid valve 4, this 2nd solenoid valve 5 functions as a safety device of a duplex.

[0008]

Drawing 2 shows the example of the power shovel equipped with the safety alarm 1 shown in drawing 1. the revolution in which this power shovel 12 was attached possible [ body 12a equipped with the crawler mold traveller, and revolution into this body ] -- a column -- 12b -- having -- revolution -- shovel 12c is prepared in column 12b. the body side alarm 2 of the safety alarm 1 -- revolution -- a column -- although attached also in 12b, as shown in drawing 2, some are attached in a place also at shovel 12c. When making run vehicles or conveying these vehicles, shovel 12c is put on transit or a transportation figure as shown in drawing 2.

[0009]

[Problem(s) to be Solved by the Device] In the emergency shutdown system accompanying the conventional obstruction detection shown in drawing 1, when vehicles are in a travelling figure or a transportation figure, the body side alarm 2 furnished with an activity machine is put on the attainment range of the alarm tone voice of the alarm horn of vehicles. Since an alarm horn had the high sound power level in decibel, when the alarm horn was operated with the posture of this activity machine, there was a problem that the body side alarm attached in the activity machine incorrect-operated, and an emergency shutdown system operated.

[0010]



This design sets it as the first purpose to offer the emergency shutdown system which can prevent incorrect actuation of a body side alarm for the purpose of solving the above-mentioned problem in the conventional vehicles system emergency shutdown system.

[0011]

[Means for Solving the Problem] An obstruction detection means to detect that this design is carried in vehicles and an obstruction exists in risk within the limits of an activity machine by which power-driven is carried out, and this activity machine, Although this obstruction detection means is related with an emergency shutdown system in a vehicles system construction equipment equipped with an emergency shutdown means to stop actuation of an activity machine in response to a signal showing having detected an obstruction In order to solve the above-mentioned technical problem, when an actuation circuit of an alarm horn established in vehicles is interlocked with and this alarm horn operates, about this design, a detector cutoff means to intercept an actuation circuit of an obstruction detection means to react to an alarm horn is established.

[0012]

In a desirable mode of this design, a detector cutoff means is constituted so that actuation may be made possible according to a posture of an activity machine. When it becomes the posture in which an obstruction detection means by which an activity machine was formed in this activity machine is placed into an attainment field of an alarm horn, as for especially a detector cutoff means, it is desirable that actuation is made to be made possible.

[0013]

[Function and Effect] since according to the above-mentioned configuration of this design the actuation circuit of an obstruction detection means to react to an alarm horn is intercepted when the alarm horn of vehicles operates, also when it is alike when alarm horn sounds, such as under transit or transportation, make vehicles the posture in which it is easy to go into a supersonic sensor, and operating an alarm horn, a possibility that an obstruction detection means may incorrect-operate disappears.

[0014]

[Example] Hereafter, one example of this design is explained about drawing 3 . In drawing 3 , the configuration of drawing 1 and a corresponding portion attach the same sign, and omit explanation. In the illustration example of this design, it has the detector interrupting device 14 prepared in the circuit which connects 2d of supersonic sensors of the body side alarm 2 to 2d of signal processors. This interrupting device 14 is constituted as a relay circuit which consists of normally closed relay contact 14a, normally open relay contact 14b, and relay coil 14c. Relay coil 14c is connected to the circuit of the actuation switch 16 of the vehicles alarm horn 15. If the actuation switch 16 of the alarm horn 15 is closed, in order that normally open relay contact 14b may close, the alarm horn 15 will generate an alarm tone. Since normally closed relay contact 14a opens to coincidence, the signal of 2d of supersonic sensors is not transmitted to signal processor 2b. Therefore, there is no possibility that the body side alarm 2 may incorrect-operate with the alarm tone which the alarm horn 15 generates.

[0015]

In drawing 3 , the detector interrupting device 14 can be replaced by micro KOMPYU pewter. Actuation of the equipment 14 in this case is attained by the program of micro KOMPYU pewter. An example of the actuation is shown in the flow chart of drawing 4 . \*\* is detected [ whether vehicles are in a travelling figure or a transportation figure first, and ] in drawing 4 . This detection should just be based on detection means, such as a pilot switch (not shown) prepared in activity machine 12c. When there are no vehicles in a travelling figure or a transportation figure, 2d of supersonic sensors is maintained in the condition of having connected with signal processor 2b. When vehicles are in a travelling figure or a transportation figure, it detects whether the switch 16 of the alarm horn 15 of vehicles is in an operating state further. When there is no switch 16 in an operating state, 2d of supersonic sensors is maintained in the condition of having connected with signal processor 2b. If a switch 16 is an operating state, 2d of supersonic sensors will be intercepted from signal processor 2b.

[0016]

Since actuation of the body side alarm 2 is intercepted in this example of this design when the alarm horn 15 of vehicles is an operating state, or when vehicles are in a travelling figure or a transportation figure and the alarm horn 15 of vehicles is operated as stated above, there is no possibility that the body side alarm 2 may incorrect-operate with the alarm tone of the alarm horn 15.

[0017]

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**TECHNICAL FIELD**

[Industrial Application] This design is related with the safety device in a vehicles system construction equipment like a hydraulic excavator. Especially this design is related with the emergency shutdown system for detecting this obstruction and carrying out the emergency shut down of the activity machine during the activity of a construction equipment, when an obstruction exists in a hazard area.

[0002]

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[Translation done.]

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**EFFECT OF THE INVENTION**

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[Function and Effect] Since according to the above-mentioned configuration of this design the actuation circuit of an obstruction detection means is intercepted when the alarm horn of vehicles operates, also when operating an alarm horn during vehicles \*\*\*\*\* or transportation, a possibility that an obstruction detection means may incorrect-operate disappears.

[0014]

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**TECHNICAL PROBLEM**

[Problem(s) to be Solved by the Device] In the emergency shutdown system accompanying the conventional obstruction detection shown in drawing 1 , when vehicles are in a travelling figure or a transportation figure, the body side alarm 2 attached activity machine \*\* picking is put on the attainment range of the alarm tone voice of the alarm horn of vehicles. Since an alarm horn had the high sound power level in decibel, when the alarm horn was operated with the posture of this activity machine, there was a problem that the body side alarm attached in the activity machine incorrect-operated, and an emergency shutdown system operated.

[0010]

This design sets it as the first purpose to offer the emergency shutdown system which can prevent incorrect actuation of a body side alarm for the purpose of solving the above-mentioned problem in the conventional vehicles system emergency shutdown system.

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**MEANS**

[Means for Solving the Problem] An obstruction detection means to detect that this design is carried in vehicles and an obstruction exists in risk within the limits of an activity machine by which power-driven is carried out, and this activity machine, Although this obstruction detection means is related with an emergency shutdown system in a vehicles system construction equipment equipped with an emergency shut down means to stop actuation of an activity machine in response to a signal showing having detected an obstruction In order to solve the above-mentioned technical problem, when an actuation circuit of an alarm horn established in vehicles is interlocked with and this alarm horn operates, about this design, a detector cutoff means to intercept an actuation circuit of an obstruction detection means is established.

[0012]  
In a desirable mode of this design, a detector cutoff means is constituted so that actuation may be made possible according to a posture of an activity machine. When it becomes the posture in which an obstruction detection means by which an activity machine was formed in this activity machine is placed into an attainment field of an alarm horn, as for especially a detector cutoff means, it is desirable that actuation is made to be made possible.

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**EXAMPLE**

[Example] Hereafter, one example of this design is explained about drawing 3 . In drawing 3 , the configuration of drawing 1 and a corresponding portion attach the same sign, and omit explanation. In the illustration example of this design, it has the detector interrupting device 14 prepared in the circuit which connects microphone 2d of the body side alarm 2 to signal processor 2b. This interrupting device 14 is constituted as a relay circuit which consists of normally closed relay contact 14a, normally open relay contact 14b, and relay coil 14c. Relay coil 14c is connected to the circuit of the actuation switch 16 of the vehicles alarm horn 15. If the actuation switch 16 of the alarm horn 15 is closed, in order that normally open relay contact 14b may close, the alarm horn 15 will generate an alarm tone. Since normally closed relay contact 14a opens to coincidence, a microphone 2d signal is not transmitted to signal processor 2b. Therefore, there is no possibility that the body side alarm 2 may incorrect-operate with the alarm tone which the alarm horn 15 generates.

[0015]

In drawing 3 , the detector interrupting device 14 can be replaced by micro KOMPYU pewter. Actuation of the equipment 14 in this case is attained by the program of micro KOMPYU pewter. An example of the actuation is shown in the flow chart of drawing 4 . \*\* is detected [ whether vehicles are in a travelling figure or a transportation figure first, and ] in drawing 4 . This detection should just be based on detection means, such as a pilot switch (not shown) prepared in activity machine 12c. When there are no vehicles in a travelling figure or a transportation figure, microphone 2d is maintained in the condition of having connected with signal processor 2b. When vehicles are in a travelling figure or a transportation figure, it detects whether the switch 16 of the alarm horn 15 of vehicles is in an operating state further. When there is no switch 16 in an operating state, it is a signal about microphone 2d.

It maintains in the condition of having connected with processor 2b. If a switch 16 is an operating state, microphone 2d will be intercepted from signal processor 2b.

[0016]

Since actuation of the body side alarm 2 is intercepted in this example of this design when the alarm horn 15 of vehicles is an operating state, or when vehicles are in a travelling figure or a transportation figure and the alarm horn 15 of vehicles is operated as stated above, there is no possibility that the body side alarm 2 may incorrect-operate with the alarm tone of the alarm horn 15.

[0017]

[Filing Date] January 22, Heisei 4 [the procedure amendment 1]

[Document to be Amended] Specification [the subject name for amendment] Whole sentence [the amendment method] Modification [the contents of amendment]

[Detailed explanation of a design]

[0001]

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[Translation done.]

**\* NOTICES \***

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3. In the drawings, any words are not translated.

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**DESCRIPTION OF DRAWINGS**

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**[Brief Description of the Drawings]**

**[Drawing 1]** The schematic diagram showing an example of the conventional emergency shutdown system.

**[Drawing 2]** The side elevation showing an example of the power shovel by which this design is applied.

**[Drawing 3]** The schematic diagram of an emergency shutdown system showing one example of this design.

**[Drawing 4]** The flow chart which shows the actuation program in other examples of this design.

**[0011]**

**[Description of Notations]**

1 -- a safety alarm and 2 -- a vehicles side alarm and 3 -- an operator side alarm, and 4 and 5 -- a solenoid valve and 6 -- a control valve and 7 -- a cylinder and 8 -- a pilot pump and 9 -- a hydraulic pump and 10 -- an engine and 11 -- a hand control valve and 12 -- a power shovel and 14 -- an interrupting device.

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**[Translation done.]**



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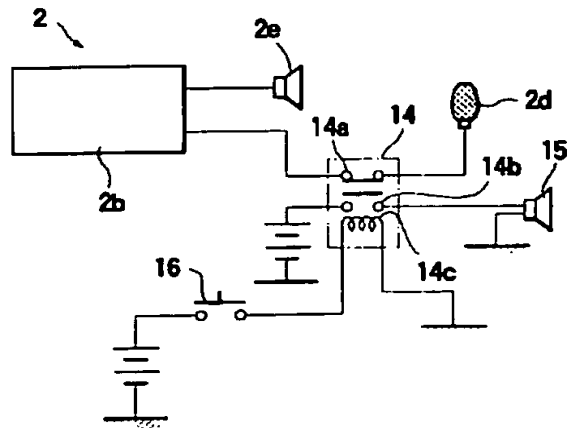
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(54)【考案の名称】 車両系建設機械における緊急停止装置

(57)【要約】

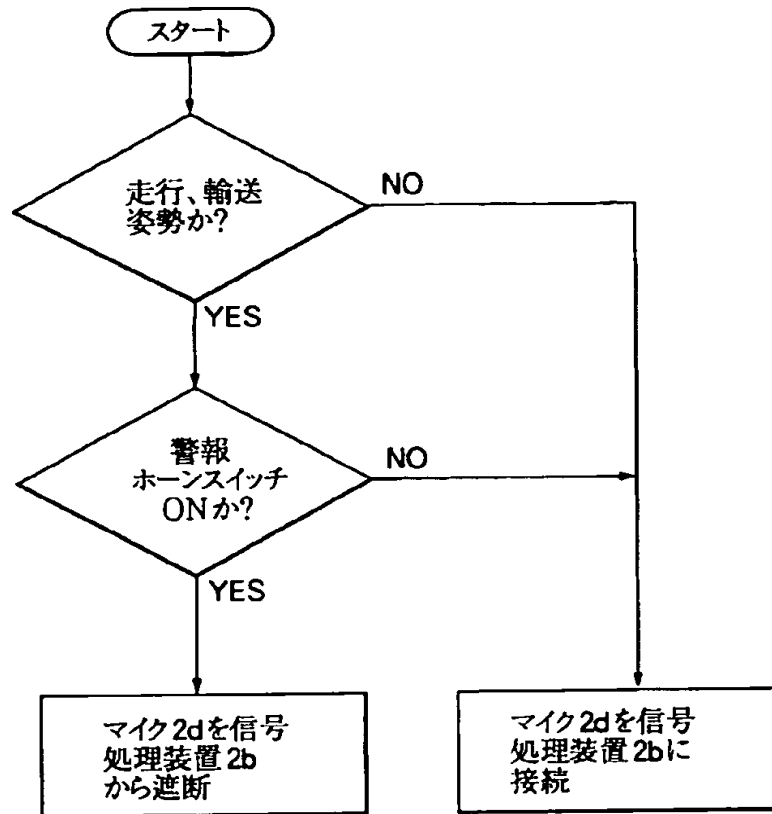
【目的】 車両系建設機械の緊急停止装置において、車両の警報ホーンが発生する警報音により緊急停止装置が誤作動しないようにすること。

【構成】 緊急停止装置の車体側に設けられる障害物検出手段の作動回路を警報ホーンの作動回路と連動させ、警報ホーンが作動しているときには、障害物検出手段の作動回路が遮断されるように構成する。





【図4】



## 【手続補正書】

【提出日】平成4年1月22日

## 【手続補正1】

【補正対象書類名】明細書

【補正対象項目名】全文

【補正方法】変更

【補正内容】

【書類名】明細書

【考案の名称】車両系建設機械における緊急停止装置

## 【実用新案登録請求の範囲】

【請求項1】 車両に搭載され動力駆動される作業機と、前記作業機の危険範囲内に障害物が存在することを検出する障害物検出手段と、前記障害物検出手段が障害物を検出したことを表す信号を受けて前記作業機の作動を停止させる緊急停止手段とを備えた車両系建設機械における緊急停止装置において、車両に設けられた警報ホーンの作動回路に連動して前記警報ホーンが作動したとき警報ホーンに反応する前記障害物検出手段の作動回路

を遮断する検出回路遮断手段が設けられたことを特徴とする車両系建設機械における緊急停止装置。

【請求項2】 請求項1に記載した車両系建設機械における緊急停止装置において、前記検出回路遮断手段は、前記作業機の姿勢に応じて作動可能とされるようになったことを特徴とする車両系建設機械における緊急停止装置。

【請求項3】 請求項1または2に記載した車両系建設機械における緊急停止装置において、前記検出回路遮断手段は、前記作業機が該作業機に設けられた前記障害物検出手段を前記警報ホーンの到達領域内に置くような姿勢になったとき作動可能とされるようになったことを特徴とする車両系建設機械における緊急停止装置。

## 【図面の簡単な説明】

【図1】 従来の緊急停止装置の一例を示す概略図。

【図2】 本考案が適用されるパワーショベルの一例を示す側面図。

【図3】 本考案の一実施例を示す緊急停止装置の概

略図。

【図4】 本考案の他の実施例における作動プログラムを示すフローチャート。

【0018】

【符号の説明】

1は安全警報装置、2は車両側警報装置、3は作業側警報装置、4と5は電磁弁、6は制御弁、7はシリンダ、8はパイロットポンプ

\* プ、9は油圧ポンプ、10

はエンジン、11は手動制御弁、12はパワーショベル、14は遮断装置。

【手続補正2】

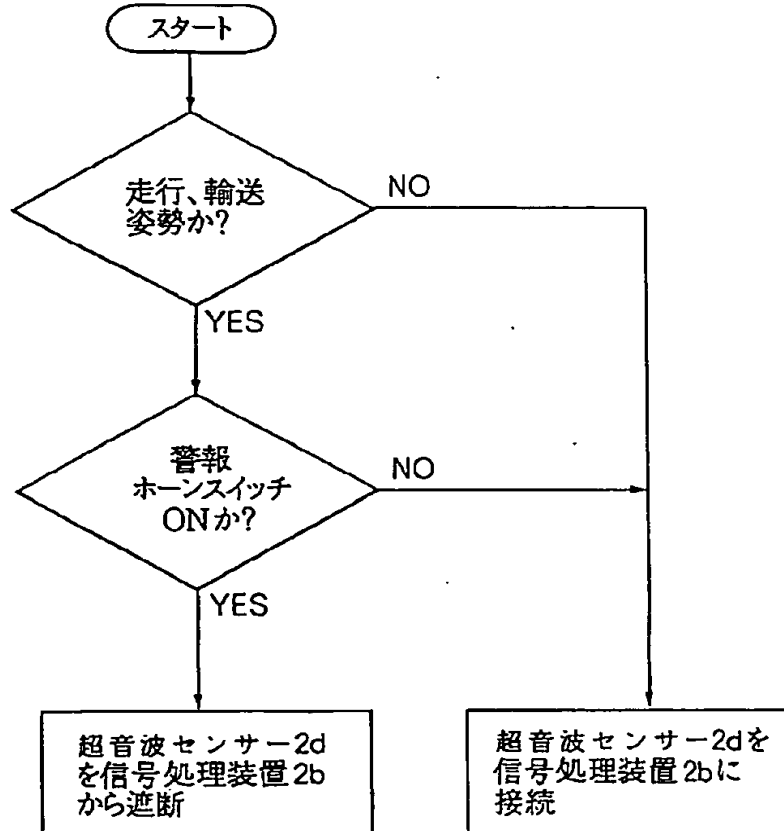
【補正対象書類名】図面

【補正対象項目名】図4

【補正方法】変更

【補正内容】

【図4】



## 【考案の詳細な説明】

## 【0001】

【産業上の利用分野】 本考案は、たとえば油圧ショベルのような車両系建設機械における安全装置に関する。特に本考案は、建設機械の作業中に、危険区域内に障害物が存在する場合に、この障害物を検出して作業機を緊急停止させるための緊急停止装置に関する。

## 【0002】

【従来技術】 たとえば油圧ショベル等の車両系建設機械においては、ショベルの掘削範囲内あるいは旋回範囲内に、作業員その他の障害物が存在するかどうか、を検出して、警報を発すると同時に、ショベル等の作業機を緊急に停止させるための緊急停止装置を備えている。また、このような車両に搭載した作業機に限らず、トラクタやドーザー等の車両は、後進中に後方の障害物を検出するためのバックセンサを備えている。このようなトラクタやドーザー等も含める意味での作業機の緊急停止装置は、作業の安全管理上きわめて重要である。

## 【0003】

従来のこの種緊急停止装置の構成の一例を、図1に示す。図において、車両側と車両外にある作業者との間に安全警報装置1が設けられている。この安全警報装置1は、車両側の超音波警報機2と作業者側の超音波警報機3とから構成される。車両側警報機2は、超音波を周囲に放射するスピーカー2eと、作業者側の警報機3から発信された別の周波数の超音波を受信するマイク2dからなる。マイク2dとスピーカー2eとは信号処理装置2bに接続される。作業者側の警報機3は、車両側の警報機2のスピーカー2eから放射される超音波を受信するマイク3dと、車両側警報機2からの超音波を受信したときのみ、別の周波数で超音波を発信するスピーカー3eとからなる。

## 【0004】

マイク3dとスピーカー3eは、信号処理装置3bに接続される。車両側警報機2のスピーカー2dが発生する超音波は、作業者側警報機3のマイク3dに受けられ、作業者側警報機3の信号処理装置3bが、スピーカー3dに別の周波数の超音波を発生させる。同様にして、作業者側警報機3のスピーカー3eが発生

する超音波は、車両側警報機2のマイク2dに受けられる。車両側警報機2がスピーカー2eによりある周波数の超音波を発信し、それから一定時間後に作業側警報機3から発信される別の周波数の超音波を検出したときにのみ、作業者が存在するものとして認識する。また、車両側警報機2から超音波を発信した後、作業側警報機3からの超音波を受信するまでの時間により、作業者までの距離を判断する。

【0005】

車両側警報機2の信号処理表示装置2bは、マイク2dが障害物を検出したとき、その検出信号を受けて障害物信号を信号線2fに出力する。

【0006】

車両に搭載したエンジン10には該エンジン10により駆動される油圧ポンプ9が設けられている。さらに、油圧ポンプ9には、パイロット油圧供給用のパイロットポンプ8が設けられる。油圧ポンプ9の吐出圧は、作業機制御弁6を介して作業機駆動用の油圧シリンダ7に送られる。パイロットポンプ8からのパイロット油圧は、電磁弁4および操作レバー11aにより操作される手動制御弁11を介して作業機制御弁6のパイロットポートに接続される。電磁弁4が開いているときは、パイロットポンプ8からのパイロット油圧は、手動制御弁11の操作方向に応じて制御弁6を上方または下方の作動位置に駆動する。信号線2fに出力された車体側警報機2からの障害物信号は、電磁弁4を作動させて該電磁弁4を閉方向に駆動する。電磁弁4が閉じたとき、制御弁6へのパイロット油圧は遮断され、制御弁6は中立位置に保持される。したがって、シリンダ7への油圧の供給が断たれる。

【0007】

図1に示す装置では、パイロットポンプ8から制御弁6に至る油圧回路に、電磁弁4に加えて第2の電磁弁5が設けられている。この電磁弁5は、電磁弁4と同様に、信号線2fに出力された障害物信号により閉鎖方向に駆動される。この第2の電磁弁5は、電磁弁4による安全装置に加えて二重の安全装置として機能する。

【0008】

図2は、図1に示す安全警報装置1を備えたパワーショベルの例を示すものである。このパワーショベル12は、クローラ型走行装置を備えた車体12aと、該車体に旋回可能に取り付けられた旋回塔12bとを備え、旋回塔12bにはショベル12cが設けられている。安全警報装置1の車体側警報機2は、旋回塔12bにも取り付けられるが、図2に示すようにショベル12cにも数箇所に取り付けられる。この車両を走行させたり輸送したりする場合には、ショベル12cは図2に示すような走行または輸送姿勢に置かれる。

#### 【0009】

【考案が解決しようとする課題】 図1に示す従来の障害物検出に伴う緊急停止装置では、車両が走行姿勢または輸送姿勢にあるとき、作業機に取り付けた車体側警報機2が、車両の警報ホーンの警報音声の到達範囲に置かれる。警報ホーンは音響パワーレベルが高いため、この作業機の姿勢で警報ホーンを作動させると、作業機に取り付けた車体側警報機が誤作動し、緊急停止装置が作動する、という問題があった。

#### 【0010】

本考案は、従来の車両系緊急停止装置における上述の問題を解決することを目的とするもので、車体側警報機の誤作動を防止できる緊急停止装置を提供することを第一の目的とする。

#### 【0011】

【課題を解決するための手段】 本考案は、車両に搭載され動力駆動される作業機と、該作業機の危険範囲内に障害物が存在することを検出する障害物検出手段と、該障害物検出手段が障害物を検出したことを表す信号を受けて作業機の作動を停止させる緊急停止手段とを備えた車両系建設機械における緊急停止装置に関するものであるが、上記課題を解決するため、本考案では、車両に設けられた警報ホーンの作動回路に連動して該警報ホーンが作動したとき障害物検出手段の作動回路を遮断する検出回路遮断手段を設ける。

#### 【0012】

本考案の好ましい態様においては、検出回路遮断手段は、作業機の姿勢に応じて作動可能とされるように構成される。特に、検出回路遮断手段は、作業機が該

作業機に設けられた障害物検出手段を警報ホーンの到達領域内に置くような姿勢になったとき作動可能とされるようにすることが好ましい。

【0013】

【作用および効果】 本考案の上記構成によれば、車両の警報ホーンが作動されるとき、障害物検出手段の作動回路が遮断されるので、車両が走行中または輸送中に警報ホーンを作動させたときにも障害物検出手段が誤作動する恐れがなくなる。

【0014】

【実施例】 以下、本考案の一実施例を図3について説明する。図3において、図1の構成と対応する部分は同一の符号を付して説明を省略する。本考案の図示実施例においては、車体側警報機2のマイク2dを信号処理装置2bに接続する回路内に設けられた検出回路遮断装置14を有する。この遮断装置14は常時閉のリレー接点14aと常時開のリレー接点14bとリレーコイル14cとからなるリレー回路として構成される。リレーコイル14cは車両警報ホーン15の作動スイッチ16の回路に接続される。警報ホーン15の作動スイッチ16が閉じられると、常時開のリレー接点14bが閉じるため警報ホーン15が警報音を発生する。同時に、常時閉のリレー接点14aが開くので、マイク2dの信号は信号処理装置2bには伝達されない。したがって、警報ホーン15の発生する警報音により車体側警報機2が誤作動する恐れはない。

【0015】

図3において、検出回路遮断装置14はマイクロコンピュータにより置き換えることができる。この場合の装置14の作動は、マイクロコンピュータのプログラムにより達成される。その作動の一例を、図4のフローチャートに示す。図4において、先ず車両が走行姿勢または輸送姿勢にあるかどうか、が検出される。この検出は、作業機12cに設けた検出スイッチ（図示せず）などの検出手段によればよい。車両が走行姿勢または輸送姿勢にないときは、マイク2dを信号処理装置2bに接続した状態に維持する。車両が走行姿勢または輸送姿勢にあるときは、さらに車両の警報ホーン15のスイッチ16が作動状態にあるかどうか、を検出する。スイッチ16が作動状態にないときは、マイク2dを信号



処理装置 2 b に接続した状態に維持する。スイッチ 1 6 が作動状態であれば、マイク 2 d を信号処理装置 2 b から遮断する。

【0016】

以上述べたように、本考案のこの実施例では、車両の警報ホーン 1 5 が作動状態のとき、あるいは車両が走行姿勢または輸送姿勢にあつて車両の警報ホーン 1 5 が作動させられたとき、車体側警報機 2 の作動が遮断されるので、警報ホーン 1 5 の警報音により車体側警報機 2 が誤作動する恐れはない。

【0017】

【提出日】平成4年1月22日

【手続補正1】

【補正対象書類名】明細書

【補正対象項目名】全文

【補正方法】変更

【補正内容】

【考案の詳細な説明】

【0001】

【産業上の利用分野】 本考案は、たとえば油圧ショベルのような車両系建設機械における安全装置に関する。特に本考案は、建設機械の作業中に、危険区域内に障害物が存在する場合に、この障害物を検出して作業機を緊急停止させるための緊急停止装置に関する。

【0002】

【従来技術】 たとえば油圧ショベル等の車両系建設機械においては、ショベルの掘削範囲内あるいは旋回範囲内に、作業員その他の障害物が存在するかどうか、を検出して、警報を発すると同時に、ショベル等の作業機を緊急に停止させるための緊急停止装置を備えている。また、このような車両に搭載した作業機に限らず、トラクタやドーザー等の車両は、後進中に後方の障害物を検出するためのバックセンサを備えている。このようなトラクタやドーザー等も含める意味での作業機の緊急停止装置は、作業の安全管理上きわめて重要である。

## 【0003】

従来のこの種緊急停止装置の構成の一例を、図1に示す。図において、車両側と車両外にある作業者との間に安全警報装置1が設けられている。この安全警報装置1は、車両側の超音波警報機2と作業者側の超音波警報機3とから構成される。車両側警報機2は、超音波を周囲に放射するスピーカー2eと、作業者側の警報機3から発信された別の周波数の超音波を受信する超音波センサー2dからなる。超音波センサー2dとスピーカー2eとは信号処理装置2bに接続される。作業者側の警報機3は、車両側の警報機2のスピーカー2eから放射される超音波を受信する超音波センサー3dと、車両側警報機2からの超音波を受信したときのみ、別の周波数で超音波を発信するスピーカー3eとからなる。

## 【0004】

超音波センサー3dとスピーカー3eは、信号処理装置3bに接続される。車両側警報機2のスピーカー2dが発生する超音波は、作業者側警報機3の超音波センサー3dに受けられ、作業者側警報機3の信号処理装置3bが、スピーカー3dに別の周波数の超音波を発生させる。同様にして、作業者側警報機3のスピーカー3eが発生する超音波は、車両側警報機2の超音波センサー2dに受けられる。車両側警報機2がスピーカー2eによりある周波数の超音波を発信し、それから一定時間後に作業者側警報機3から発信される別の周波数の超音波を検出したときのみ、作業者が存在するものとして認識する。また、車両側警報機2から超音波を発信した後、作業者側警報機3からの超音波を受信するまでの時間により、作業者までの距離を判断する。

## 【0005】

車両側警報機2の信号処理表示装置2bは、超音波センサー2dが障害物を検出したとき、その検出信号を受けて障害物信号を信号線2fに出力する。

## 【0006】

車両に搭載したエンジン10には該エンジン10により駆動される油圧ポンプ9が設けられている。さらに、油圧ポンプ9には、パイロット油圧供給用のパイロットポンプ8が設けられる。油圧ポンプ9の吐出圧は、作業機制御弁6を介して作業機駆動用の油圧シリンダ7に送られる。パイロットポンプ8からのパイロ

ット油圧は、電磁弁4および操作レバー11aにより操作される手動制御弁11を介して作業機制御弁6のパイロットポートに接続される。電磁弁4が開いているときは、パイロットポンプ8からのパイロット油圧は、手動制御弁11の操作方向に応じて制御弁6を上方または下方の作動位置に駆動する。信号線2fに出力された車体側警報機2からの障害物信号は、電磁弁4を作動させて該電磁弁4を閉方向に駆動する。電磁弁4が閉じたとき、制御弁6へのパイロット油圧は遮断され、制御弁6は中立位置に保持される。したがって、シリンダ7への油圧の供給が断たれる。

#### 【0007】

図1に示す装置では、パイロットポンプ8から制御弁6に至る油圧回路に、電磁弁4に加えて第2の電磁弁5が設けられている。この電磁弁5は、電磁弁4と同様に、信号線2fに出力された障害物信号により閉鎖方向に駆動される。この第2の電磁弁5は、電磁弁4による安全装置に加えて二重の安全装置として機能する。

#### 【0008】

図2は、図1に示す安全警報装置1を備えたパワーショベルの例を示すものである。このパワーショベル12は、クローラ型走行装置を備えた車体12aと、該車体に旋回可能に取り付けられた旋回塔12bとを備え、旋回塔12bにはショベル12cが設けられている。安全警報装置1の車体側警報機2は、旋回塔12bにも取り付けられるが、図2に示すようにショベル12cにも数個所に取り付けられる。この車両を走行させたり輸送したりする場合には、ショベル12cは図2に示すような走行または輸送姿勢に置かれる。

#### 【0009】

【考案が解決しようとする課題】 図1に示す従来の障害物検出に伴う緊急停止装置では、車両が走行姿勢または輸送姿勢にあるとき、作業機を取り付けた車体側警報機2が、車両の警報ホーンの警報音声の到達範囲に置かれる。警報ホーンは音響パワーレベルが高いため、この作業機の姿勢で警報ホーンを作動させると、作業機に取り付けた車体側警報機が誤作動し、緊急停止装置が作動する、という問題があった。

## 【0010】

本考案は、従来の車両系緊急停止装置における上述の問題を解決することを目的とするもので、車体側警報機の誤作動を防止できる緊急停止装置を提供することを第一の目的とする。

## 【0011】

【課題を解決するための手段】 本考案は、車両に搭載され動力駆動される作業機と、該作業機の危険範囲内に障害物が存在することを検出する障害物検出手段と、該障害物検出手段が障害物を検出したことを表す信号を受けて作業機の作動を停止させる緊急停止手段とを備えた車両系建設機械における緊急停止装置に関するものであるが、上記課題を解決するため、本考案では、車両に設けられた警報ホーンの作動回路に連動して該警報ホーンが作動したとき警報ホーンに反応する障害物検出手段の作動回路を遮断する検出回路遮断手段を設ける。

## 【0012】

本考案の好ましい態様においては、検出回路遮断手段は、作業機の姿勢に応じて作動可能とされるように構成される。特に、検出回路遮断手段は、作業機が該作業機に設けられた障害物検出手段を警報ホーンの到達領域内に置くような姿勢になったとき作動可能とされるようにすることが好ましい。

## 【0013】

【作用および効果】 本考案の上記構成によれば、車両の警報ホーンが作動されるとき、警報ホーンに反応する障害物検出手段の作動回路が遮断されるので、車両を走行中または輸送中など警報ホーン音が超音波センサーに入り易い姿勢にした時にに警報ホーンを作動させたときにも障害物検出手段が誤作動する恐れがなくなる。

## 【0014】

【実施例】 以下、本考案の一実施例を図3について説明する。図3において、図1の構成と対応する部分は同一の符号を付して説明を省略する。本考案の図示実施例においては、車体側警報機2の超音波センサー2dを信号処理装置2dに接続する回路内に設けられた検出回路遮断装置14を有する。この遮断装置14は常時閉のリレー接点14aと常時開のリレー接点14bとリレーコイル14

cとからなるリレー回路として構成される。リレーコイル14cは車両警報ホーン15の作動スイッチ16の回路に接続される。警報ホーン15の作動スイッチ16が閉じられると、常時開のリレー接点14bが閉じるため警報ホーン15が警報音を発生する。同時に、常時閉のリレー接点14aが開くので、超音波センサー2dの信号は信号処理装置2bには伝達されない。したがって、警報ホーン15の発生する警報音により車体側警報機2が誤作動する恐れはない。

#### 【0015】

図3において、検出回路遮断装置14はマイクロコンピュータにより置き換えることができる。この場合の装置14の作動は、マイクロコンピュータのプログラムにより達成される。その作動の一例を、図4のフローチャートに示す。図4において、先ず車両が走行姿勢または輸送姿勢にあるかどうか、が検出される。この検出は、作業機12cに設けた検出スイッチ（図示せず）などの検出手段によればよい。車両が走行姿勢または輸送姿勢にないときは、超音波センサー2dを信号処理装置2bに接続した状態に維持する。車両が走行姿勢または輸送姿勢にあるときは、さらに車両の警報ホーン15のスイッチ16が作動状態にあるかどうか、を検出する。スイッチ16が作動状態にないときは、超音波センサー2dを信号処理装置2bに接続した状態に維持する。スイッチ16が作動状態であれば、超音波センサー2dを信号処理装置2bから遮断する。

#### 【0016】

以上述べたように、本考案のこの実施例では、車両の警報ホーン15が作動状態のとき、あるいは車両が走行姿勢または輸送姿勢にあつて車両の警報ホーン15が作動させられたとき、車体側警報機2の作動が遮断されるので、警報ホーン15の警報音により車体側警報機2が誤作動する恐れはない。

#### 【0017】